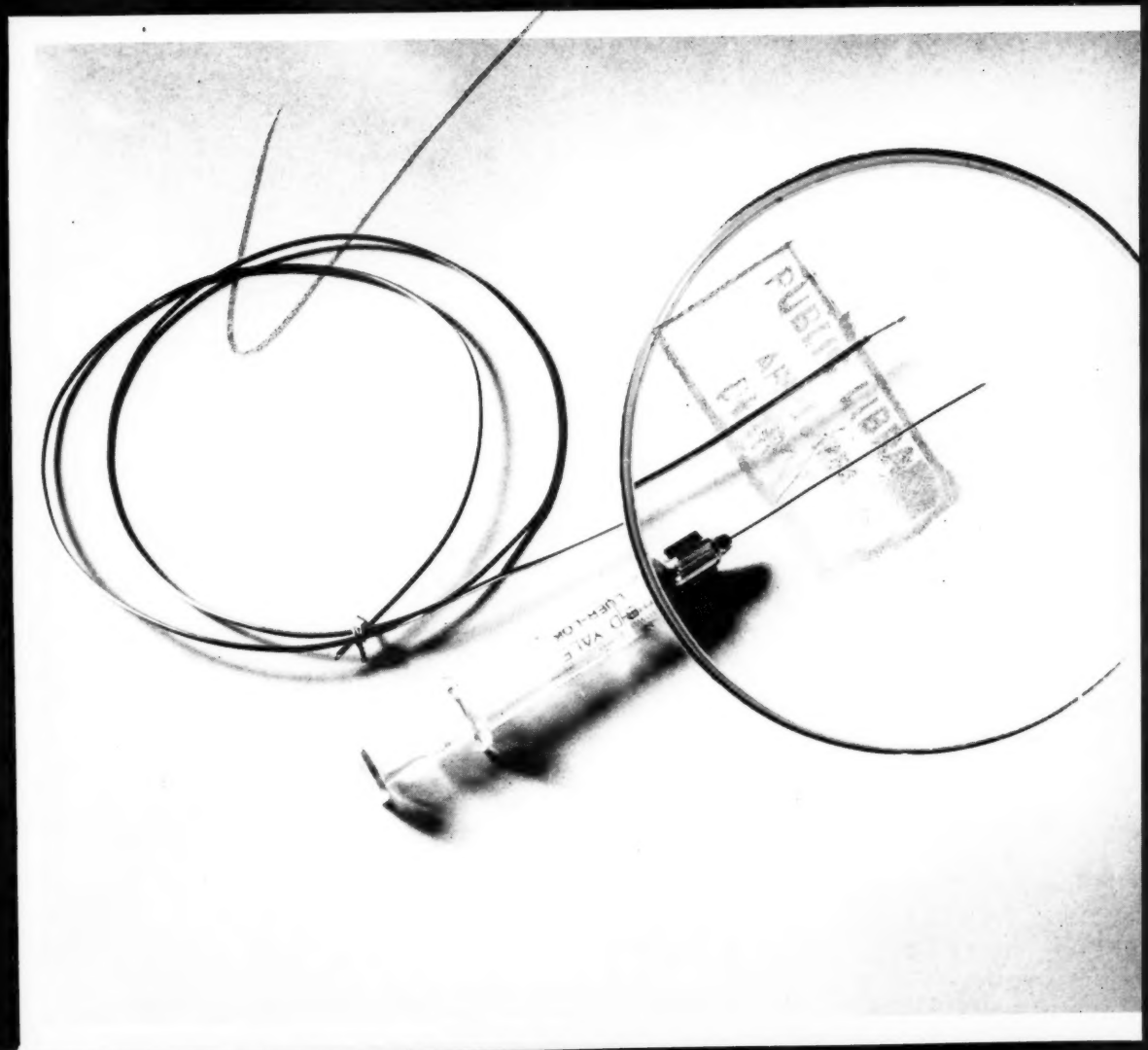
Midwest Engineer



WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

they're off!

As an opening gesture a number of V.I.P.s (very important persons) have entered a competition to obtain new members for W.S.E. Their efforts are recorded from week to week on a chart displayed in the W.S.E. lounge.

Any W.S.E. member automatically becomes a V.I.P. upon bringing in 3 or more new members.

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Serving the Engineering Profession

MARCH, 1954 — Vol. 6, No. 10

CONTENTS

COVER STORY

Comparison of a thermocouple, developed at Argonne National Laboratory, to a standard hypodermic needle. The magnified portion shows the lead end of a 0.040 inch outside diameter inconel thermocouple tube into which a 0.015" constantan wire has been inserted through its entire length. It is compared to a standard hypodermic needle having an outside diameter of approximately 0.025". Couples of any length are possible, but those produced at Argonne have been limited to twenty feet.

—Argonne National Laboratory Photo

April 12, Hydraulic, Sanitary and Municipal Engineering Section

Speaker: a panel composed of John T. Kearns, city engineer, Champaign, Ill.; Mark E. Keane, village manager, Oak Park, Ill.; and Virgil E. Gunlock, commissioner of public works, Chicago.

Subject: "The Management of Municipal Facilities." After the panel discussion by these municipal officials there will be a question and answer period. The film, "A Pipeline to the Clouds" will preceed the meeting.

April 14, Noon Luncheon Meeting

Speaker: J. N. Jobaris, equipment engineer, Chicago Transit Authority.

Subject: "CTA Pioneers a New Fuel." The problem of eliminating noxious fumes from busses has been solved by the use of propane. What is propane? What are its implications? Come and hear this midwest pioneer in the use of the new automotive fuel. The 1,000 vehicles using this fuel represent $20,000,000. Hear about the 250 new rapid transit cars, too.

April 21, Noon Luncheon Meeting

Speaker: Norman H. Davis, executive engineer, Underwriters' Laboratories, Inc.

Subject: "Testing for Electrical Safety." Have you ever wondered what the "Underwriters'" label means to you? At this meeting you can learn its real importance. You'll also have a pleasant lunch.

April 22, Communications Engineering Section

Speaker: Clifford C. Duncan, American Telephone and Telegraph Co., general manager of special projects, Long Lines Department.

Subject: "The First Trans-atlantic Telephone Cable." The speaker is in charge of this undertaking and will describe some of its features. He will also touch on the vivid history of under-water telegraph cables. Illustrations will be used.

April 26, WSE General Program

Speaker: Dr. H. K. Ihrig, vice-president in charge of research, Allis-Chalmers Manufacturing Co.

Subject: "The Romance of Metals." If you like romances, here's one about metals and their unique and interesting relationships with industry.

Note: The proposed amendments to the Western Society Constitution will be discussed from 7:00 to 7:30 p.m. (See page 27.) in lieu of the pre-meeting movie.

April 28, Noon Luncheon Meeting

Speaker: P. M. Linscott, traffic engineer, De Leuw, Cather & Co.

Subject: "Progress in the Chicago Parking Program." This involves a subject that makes itself felt everyday. Is there a light behind that dark cloud? Here's your chance to find out. Kodachrome slides will illustrate the talk.

May 4, Bridge and Structural Engineering Section

Speaker: Henry Penn, district engineer, American Institute of Steel Construction.

Subject: "What's New and Different in Structural Steel?" Rational and irrational methods of construction will be explained. Slides will help in the explanations.

Industrial Hygiene and Fire Prevention

By G. W. Daubenspeck

You may well ask why is Industrial Hygiene concerned with fire prevention? I believe a brief discussion of the scope of industrial hygiene is in order. The crux of the matter is *control* of industrial health hazards.

The primary concern, is with preventing the accumulation of materials, deleterious to health, in the breathing area. This is an engineering problem. Evaluation of such a hazard and determining effectiveness of control is largely a chemical problem. We frequently need to determine quite minute amounts of contaminant and special methods need to be developed for collection and accurate estimation. The best methods sometimes turn out to depend on precise measurements of one or more physical properties such as specific gravity, refractive index, color, including infra red and ultra violet absorption; thermal or electrical conductivity, heat of reaction, and many others. Such tests require specialized equipment. A few have been and more are being adapted to continuous recording instruments. In the future, we expect such instruments to be of increasing utility.

Phases of Industrial Hygiene

Industrial skin disorders are of very great importance in causing disability. The specific harmful agent is often very difficult to trace down and control. Ineffective agents such as cause brucellosis are of great importance in some industries. The common cold is a concern of the industrial hygienist.

The extreme importance of education of the worker, as to the nature and control of the hazards in connection with his work, is only now being recognized. Many highly skilled workers of long experience lack a proper respect for the potential dangers to which they are repeatedly exposed.

As population and industry become more concentrated, the air pollution problem becomes more acute. The skills of the industrial hygienist carry over directly into this problem. There is a many sided relationship between health and mechanical safety. Good housekeeping is a most important aspect of such relationships as well as numerous other phases of good plant management.

Physical health hazards are of growing concern. These include extremes of temperatures, poor lighting, ionizing radiations, industrial noise, and many others. Health hazards from ionizing radiations, various x-ray exposures, natural radioactivity, and now the numerous radioactive isotopes are of growing importance. The problem of hearing loss through industrial noise is of urgent concern. The most important of these physical agents is fire.

Fire and Explosions

Fire is no doubt the most useful agent in nearly every human culture. Fire is a source of terror to all animals. Only man has learned to control this fear. Even before its utilization by man, and especially since, fire has been an important cause of great losses. Like other important goods, it can be disastrous when allowed to get out of control. In general, fire prevention involves the same or similar skills as other industrial hygiene problems. A great many disasterous industrial fires are started by explosions. Any oxidizable material when finally divided and dispersed in the air, is potentially explosive. It takes a relatively enormous dust concentration amounting to an almost opaque cloud to propagate an explosion. However, a disastrous explosion can result from a small dust cloud within which there happens to be an area of high temperature. Ignition of such clouds is most commonly caused by open flame, static or metal spark, or current electric sparks. One of our rules requires that arc welding and open flames be kept at least 50 feet from sources, and flammable vapors. Grounding of certain equipment which may develop a static charge is regular practice. Non-sparking tools (such as hammers, and chisels of beryllium bronze) and other non-sparking equipment are indicated in certain operations. Disastrous electric sparks may result from faulty insulation, an unshielded switch or motor, or a broken or poorly fitted light bulb without proper enclosure.

This first explosion can be relatively harmless. Large flour mills have batteries of small flour milling machines each no bigger than an ordinary desk. These are enclosed with easily lifted hinged windows. Due to particles of flint in the grain, miniature dust explosions in these enclosures are a common occurrence. The pressure merely lifts the covers which fall back into place and no harm is done.

On the other hand a small explosion may jar down and ignite a larger dust cloud resulting in a chain of increasing explosions the last of which does the real damage. This emphasizes the extreme importance of scrupulous housekeeping wherever there is a dust explosion hazard. Dust tends to cling to walls and accumulate on superstructures in any area where it is produced but who knows what is safe housekeeping? After an explosion it is difficult to get a reliable estimate of how bad the housekeeping was.

When inspecting a plant, the management, more often than not feels that the housekeeping at the time is much worse than usual. A little temporary laxity can result in disaster. Even in plants that are superficially quite clean, it is common to be able to pick up great handfuls of fine easily dispersed air borne dust in out of the way places. A little pounding may dislodge dense clouds. The corrugated siding poorly fit against structural members, makes a lodging place for dust. It is of prime importance to eliminate all ledges and pockets, as far as is feasible, especially

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Mr. Daubenspeck, senior industrial hygiene engineer, Illinois Department of Labor, presented this talk before the Western Society of Engineers at the Society's headquarters in Chicago on January 5, 1954.

in hard to get at areas. Flame propagation in organic dust is slow as compared to that in metallic dust. In the former, disaster may sometimes be prevented by readily lifted ceilings or windows loosely hung or with scored glass. Such precautions would usually be ineffective for metal dust explosions. The explosion of starch is like cordite; that of aluminum like TNT.

The making of bronze, aluminum, magnesium, or other metallic powder involves very great explosion hazards. Because of the great fire hazard in many operations involving the handling of metallic magnesium, magnesium is sometimes considered the only metallic powder that will readily explode. When there is an aluminum dust explosion it has been common to question whether magnesium dust was not involved. Under the critical conditions aluminum dust alone is just as hazardous.

Flammable gases and vapors are another source of disastrous explosions. Here again, the concentration in the air needed to propagate an explosion must be large. Explosive limits range in percents. Concentrations hazardous to breathe range from one part per million to about one thousand or 0.1%. In general, an explosive mixture contains about a hundred times as much contaminant as is safe to breathe. This means that if we control the contaminant from the health standpoint, at all times, we are always far below the explosive range. It does not mean that no other precautions are needed. Whenever, even momentarily and in some remote corner an explosive limit occurs with a source of ignition, there will be an explosion.

Examples of Catastrophies

If is one of our jobs in the Factory Inspection Division to do what we can to prevent catastrophies. When one occurs, we try to learn as much as possible which may be of value in preventing another. The circumstances of a few of these will be reviewed briefly.

In 1936, seven people were killed in a hexane explosion of a soy bean oil extraction plant of Glidden Company. The new plant has open metal flooring preventing high concentrations of vapors from collecting in any one area. Prevention consists primarily in preventing accumulation of vapor. When considered in plant design the problem is greatly simplified. Similarly, all present construction of lead tetrethyl manufacturing units are modeled after the Deep Water Delaware Plant, as a result of disastrous experience. This includes floating floors separated from the walls.

In 1937 and 1938 there were two fires in Chicago in connection with the manufacture of book matches and about 20 girls were burned to death. Both fires resulted in negligence in allowing too much explosively flammable partly finished product to accumulate in one area. Fires are frequent in this industry but if the amount of product in the area of the machine is kept quite small, at all times, they are extinguished with negligible loss and no injury. In the worst of these cases, the rear exit was locked. The foreman had the key but the fire was between him and the locked door where the girls were trapped. These catastrophies pointed to the need of adequate storage of hazardous material and the imperativeness of the rigid practice of keeping material moved. Laxity, even once for a short time, can be fatal. A locked exit in violation of every fire code may have multiplied the number of deaths.

Five people were killed in the Brach Candy Company fire. A new exhaust system had been installed for sugar dust on an upper floor. This was connected to a cyclone in the penthouse where those killed were working, and to another system on a lower floor. This system was operating and had been completed except for automatic blast gates which had not yet been installed. The shock of explosion of the cyclone apparently disabled the men and the fire prevented their rescue. This stresses the danger of using equipment, even temporarily, without proper controls. In 1951, 19 men sustained fatal burns at a fire at Shell Oil Company in Wood River, Illinois. This was due to Ignition of explosive vapor in a trench, by hot flue lines which ran through the same trench. There was a failure to use approved shut down procedure resulting in a spillage of oil which was the source of the explosive vapor or at least a source of fuel for the disastrous fire. Prevention of recurrence included removal of flues from the trench, replacing trench plates by gratings to prevent vapor pockets and installation of improved oil drains. Here again control consists chiefly in prevention of accumulation of vapor but also emphasizes the danger of laxity just once.

The Haber Corporation fire this year resulted in the death of 35 people. A 3 inch polishing strap taking the first rough cut on an aluminum casting, broke. This struck the steel pulley sending a shower of sparks into a can at the base of the hood enclosure, containing dressing compound and linters. This took fire and ignited the aluminum dust. There was a rumbling, series of explosions within the pipes which sent blasts of flames out of all the hood enclosures. If the ventilation system had been functioning anything near the requirements, such a concentration of aluminum dust could not have built up.

The blasts of flame from the hoods set fire to an 80 gallon tank of naptha on the same floor. This solvent has a flashpoint of 110 degrees and a fire point of about 135 degrees F, and, is not considered flammable, but if the tanks had automatic fire protection, the fire could probably have been stopped there. The building was being reconstructed while production was going on. The front stairway was cut off and the main other means of exit, a wooden stairway, was very quickly filled with vapor, smoke, and later flames, trapping the people on the second, third, and fourth floors. A temporary fire escape crossed open windows and was not used due to flames pouring directly across.

This great catastrophe illustrates the need of interlocking devices on exhaust systems where there is explosive dust. Laboratory studies showed that no magnesium dust was involved. Tanks of relatively non-flammable solvents should be automatically fire controlled. If manufacturing is carried on during reconstruction, greater than usual precautions against fire and other hazards, should be required.

The Superior Sleeprite Company fire started from a dip tank without adequate control and the recent Genral Motors fire involved a solvent of a supposedly safely high flashpoint.

Special Considerations

Carbon tetrachloride is a very toxic solvent admired by some fire prevention engineers. It is sometimes substituted for a flammable solvent with no regard for the added health hazard. It has been added to flammable solvent to make a non-burnable mixture. The carbon tetrachloride being very volatile evaporates first giving a serious health hazard. At the same time, the mixture depended on to be safe from fire becomes highly flammable. Carbon tetrachloride is not recommended for fire extinguishers because of the vapor hazard during filling and use, and the toxic breakdown products when used on hot fires.

To prevent explosions of dust, gases, or vapors, in exhaust systems, it is important to have an interlocking device preventing the machines from operating unless the exhaust is on. This can be done with a sail switch in the duct or other pressure operated switch to insure a given minimum air velocity. Dry collectors of explosive dust should not be permitted indoors.

In the rather new electrostatic coating equipment, it is important that the paint spray and especially the electric charge be automatically turned off whenever the exhaust ventilation fails. So long as the regular booth velocity (150 linear feet per minute) is maintained throughout the area, the vapor concentration can never normally build up to the explosive limit.

Dip tanks are an important source of, or contributing factor in, many fires. Suitable overflow pipes often assist materially in preventing the spread of fires. One type of automatic fire protection for dip tanks consists of a dropping cover operated by a fusible link. This is effective if the cover can close tight. However, the cover may be held up by protruding work or a stirrer.

Better control consists of automatic fire protection by carbon dioxide or other suitable material. It is important and often not the case, that, the fusible link or thermal switch is in a position to be operated by the heat of a fire.

We approve of automatic water sprinklers equipped with automatic pressure alarm system. We do not believe they should be located over dip tanks as is frequently the case. As a minimum requirement, under such conditions, we insist that the fire protection for the tank be set to operate at a lower temperature than the water sprinkler.

Gas ovens fired without automatic

(Continued on Page 12)

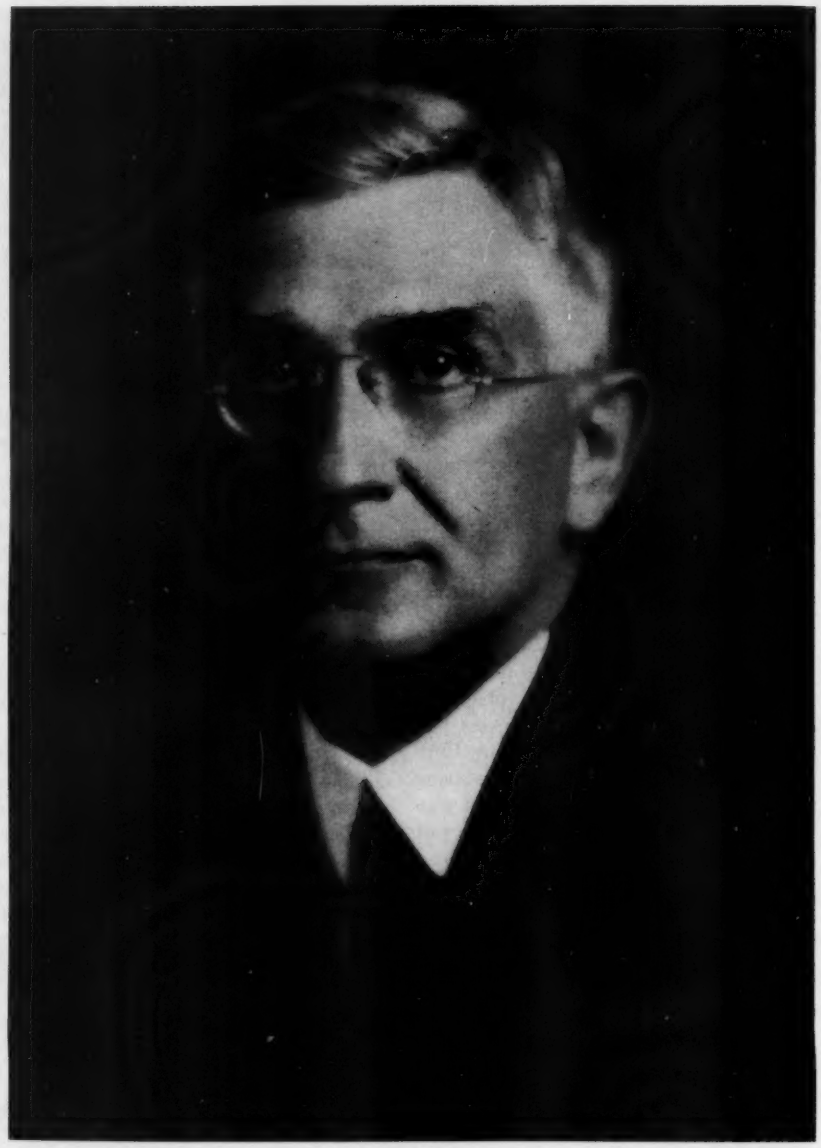
Lewis K. Sillcox Member of WSE Is ASME President

Lewis K. Sillcox, MWSE, honorary vice-chairman of the board of The New York Air Brake Company, is the 1954 president of The American Society of Mechanical Engineers.

Mr. Sillcox, who lives in Watertown, New York, has been identified with the transportation industry since he started his career in 1903 as a railroad foundry apprentice. From 1918 to 1927 he was general superintendent of motive power of the Chicago, Milwaukee & St. Paul Railroad, and in the latter year became first vice-president of The New York Air Brake Company. In 1948 he was made a director and the following year was elected executive vice-president. In 1952 he was elected vice-chairman of the board and in 1953 became honorary vice-chairman of the board.

Mr. Sillcox was born in Germantown, Pa. in 1886, and was educated at Trinity School, New York, and L'Ecole Polytechnique, Brussels. He has been the recipient of honorary degrees from Clarkson College, Cumberland University and Syracuse University, and is a trustee of Clarkson. For many years he has been a lecturer on transportation and economics at the Harvard Graduate School of Business Administration, Yale, Massachusetts Institute of Technology, and Princeton, on subjects relating to railway practice and applied mechanics. He is also a lecturer in engineering at Purdue University and a contributor to many technical publications.

He is a Fellow of the ASME to which he has belonged since 1916. He was made an Honorary Member in 1946. In 1943 he was awarded the ASME Medal for distinguished service in engineering and science.



Lewis K. Sillcox

An active influence in carrying out improved methods of power application and of train control, during the past 10 years Mr. Sillcox has been responsible for developing the brake cylinder release valve which eliminates hand bleeding retained air in standing freight cars, improved sanding methods for rail conditioning, the brake pipe feed valve (air reducing valve) which controls brake pipe pressure in freight and passenger trains irrespective of main supply head pressure, and basic brake types (freight, passenger and locomotive).

He is also responsible for designing several types of aircraft hydraulic pumps now found on practically all current military aircraft and the latest commerical aircraft.

In 1934-1936, he was chairman of the mechanical advisory committee of the Federal Co-ordinator of Transportation, and in 1945 was awarded the Gold Medal of the Institution of Locomotive Engineers of Great Britain.

Living in a Challenging Century

By Dr. John T. Rettaliata

I deeply appreciate the opportunity to address this meeting of the Western Society of Engineers.

As an educator I suspect that a group such as this one seems more exciting to me than most. I cannot help but think how badly our country needs highly-trained people—scientists, engineers, doctors, teachers. It is they who hold our nation's future in their hands.

Let us now consider that future.

When billions are a commonplace figure today, I would ordinarily hesitate to talk to you in terms of millions. And a mere 50 million or so, at that—except that the 50 million I have in mind are *people*.

They are the extra people we will be adding to the population of the United States in the half-century ahead of us.

The advent of this 50 million men and women (and, of course, there may be considerably more if some of the forecasts about our national growth come true) looms large in my thoughts about the future of our country.

In some ways those 50 million people seem to me to be among the biggest events on our national calendar. They constitute a "Red Letter" event because of the enormous pressures they are going to exert on every single seam and stitch of our national fabric.

Adding 50 million or more people will be like incorporating into the United States another present-day Illinois, another New York . . . a California . . . a Texas . . . a Pennsylvania . . . and an Ohio: six of the most densely populated states in the Union.

We number 160,000,000 people today. To serve 210,000,000 by the turn of the century will demand the vast expansion of *everything* in the United States.

It means the tremendous enlargement of every one of our common services: communication . . . transportation . . . water supply . . . power systems . . . generation of energy.

It means increased production of consumer goods.

It means more homes, apartments, garages, stores, shops.

It means 50 million more hungry mouths to feed, calling for the greater development of American agriculture, with large implications for further mechanical progress and biological progress as well.

And of course, it means meeting the need for more schools and teachers; more hospitals, doctors, and nurses; more churches and clergy; many many more scientists, engineers, and other technicians; and better-equipped institutions of science with greater teaching and research staffs.

Fifty million extra people are thus going to be a spur of almost unimaginable size to our entire economy.

From the scientific point of view, which is naturally our own, such an expanded population will surely demand the opening of new, untapped resources, such as the oceans, seas, and tidal waters; and of such areas as the polar regions.

It will press us mightily to search for substitute raw materials for industry, especially in our key resources, the minerals and the fuels.

It will urge us to develop the economical use of marginal resources such as the oil-shale seams of the Rocky mountains. And beyond that, it will urge us to speed up the development of atomic energy for peace-time purposes and perhaps hasten our efforts to employ the energy of the sun to turn the wheels of industry and to run the electric fan, the refrigerator, and the TV set at home.

Fifty million people will make imperative the creation of new processes, of better techniques, and will stimulate radical improvement and revision in all our existing tools and machinery.

These have been a few of the sobering yet exciting thoughts to which reflection today impells me.

Virtually every area of our economy, it seems to me, must be geared to meet the needs of a rapidly mounting population.

And it also must meet other requirements as well, for we have entered upon a complicated half-century, ripe with things that will deeply challenge all the abilities and capabilities of our industrial, democratic society.

For example, science has not only given us a mechanical revolution, it has given us a biological revolution, whose full force is now becoming evident to all.

Medical science has lengthened man's life span from 49 years to almost 68 years in the past half-century. This has brought about a rapidly increasing proportion of older people in our population, illustrated quickly by the fact that while our total population has doubled since 1900, the number of persons over 65 has quadrupled.

We have 13 million such older people today, but only about 3 million are in our present labor force.

By the year 2000 A.D. estimates indicate we shall have 26 million older people in the United States—13 out of every 100 persons.

They will be a staggering burden if, predominantly, they are financially dependent.

It seems to me, therefore, that another of the nation's big tasks in the coming decades is to find uses for our older manpower.

Scientific advance must develop ways and means to that end. It must make the discoveries that will create new opportunities for employment of older people and minimize the cost of their support.

We face, indeed, the fact of a greatly enlarged labor force generally in the United States: from greater employment of older people, from the demands of women, and from the natural increase in population.

Women now outnumber men for the first time in our history. In increasing measure they are pressing to enter industry. Already one-third of the women in the United States today are employed outside the home. More jobs for a greater proportion of women than ever before must be found in the future.

Our labor force now numbers 63 mil-

Dr. Rettaliata, president of Illinois Institute of Technology in Chicago, gave this talk before the Western Society of Engineers at the Society's headquarters in Chicago on January 25, 1954.

lion, about 40 per cent of the population. We may well look forward to a considerably larger percentage in the years ahead—to a working force of perhaps 75 million by 1970 . . . to 90 to 100 million by the end of the century.

If the future is in keeping with the past, we also are going to face pressures for a steady lowering of the length of the work week. Economists are making predictions of a 30-hour work week, not by the end of the century, but as near as 1980.

If, on the one hand, the need of an expanding economy is for a greater flow of goods, the shorter work week will mean a lessened flow—unless *output per man-hour* can be substantially increased.

Only an advancing science and technology, resulting in better plants, better tools and equipment, better materials and better methods, can accomplish the miracle required and give men less work —and more goods.

Among our other future problems, the burden of social security payments will fall upon us with increasing weight.

They are a lien on tomorrow. They must be paid out of future taxes. And taxes can only be paid through productivity.

National production must provide the wherewithal—an ever-increasing level of industrial output to which science and technology must substantially contribute.

Our national debt, another burden for the future, has reached the astronomical figure of more than a quarter trillion dollars.

The share of each and every one of us in that staggering sum is today around $1,700.

Only our extraordinary productivity now enables us to pay the interest on that debt—interest that amounts to some $7 billion annually.

Only in a great increase in our productivity in the years ahead would appear to reside much hope for the reduction of that debt.

Besides all this, we must maintain, and our economy sustain, a colossal defense program.

More than half of every dollar in our current federal budget is designated for military expenditures.

To maintain that program—and to increase it if events warrant—our economy must be made to function at the highest speed possible.

How can the backs of industry, business, and our people bear burdens such as these? How can we also meet the needs of peak population, and at the same time provide all with the rising standard of living we have come to regard as essential to the American way of life?

Obviously, some of the answers lie in part in the political realm . . . in social and fiscal policy . . . in legislative action . . . and in international areas.

But the basic answer, it seems to me, lies in an ever-growing productivity.

Productivity is the very life-blood of our economy. Productivity can even offset the wrong answers, the maze of contradictions and mistakes that may have hindered our development in the past—and may be with us in the future.

In short, productivity sufficiently high can help to bail us out of what I may generally describe as "social" error.

I believe the key to productivity lies in just a few but terribly important things.

First, *we must have more fundamental scientific knowledge.* On one thing virtually every scientist will agree: we have been living off the fat of prior scientific discovery. It is increasingly imperative that we now encourage and support more basic research.

We must have faster technological progress. The practical applications of discovery in pure science must be speeded up. More innovations in application must be made.

We must provide industry with a greater number of trained scientists and technicians. Our principal training grounds—our scientific schools—must turn out more, better-equipped graduates.

We must tap our richest resource—the nation's young but unused brainpower. Despite the widening of educational opportunity, only 6,000,000 men and women in America today are college graduates. Only about 600,000 people constitute our nation's scientific and engineering manpower.

Millions of young men never get beyond high school. (The figures are: one-third of all high school graduates enter college; two-thirds do not.) Yet every study made indicates the extraordinary waste in intellectual potential that this entails.

The President's Committee on Higher Education a short time ago said: "At least as many young people having the same or *greater* intelligence are outside college as are within."

We must, it seems to me, do everything we can to interest, attract and help finance when necessary, more young men of high capacity to enter upon scientific and technical careers.

We must create far more understanding about our economic system. We must engender understanding of how it functions and the profound stake we all have—and the world has—in its preservation, expansion, and extension.

These things strike me as imperative. And it is right here that institutions such as Illinois Institute of Technology come into my thoughts and into the picture generally.

For the prerequisites to productivity that I have cited are the very reasons for the existence of institutions such as Illinois Tech.

(Continued on Page 13)

Reserve Manpower Policy Development

The following is reprinted from the Engineering and Scientific Manpower "Newsletter" number 52 of January 29, for the general information of members of the Western Society of Engineers.

As reported in the Special Bulletin attached to EMC-SMC *Newsletter* #51, January 13, 1954, the Committee on Manpower Resources for National Security, under the Chairmanship of Mr. Lawrence Appley, has presented its report on "Manpower Resources for National Security" to the Director of the Office of Defense Mobilization. The Appley Committee was formed last Fall by the Director of the Office of Defense Mobilization to aid him in fulfilling the Presidential Directive to ODM to provide "a definitive study on the availability of manpower simultaneously to operate a military training program, to supply military personnel for active service and to meet the needs of the civilian economy."

It is important to remember that the Committee was charged also with the responsibility to examine a possible military training program carefully, in the light of our other military manpower needs, and in terms of its potential impact on requirements for agricultural, scientific, professional, and other skilled manpower. The President also requested that the committee analyze the effect of military manpower procurement policies on the availability of manpower for national security needs, for, in an emergency requiring full mobilization, policies and procedures for calling up men for military service would obviously have a profound influence on the availability of manpower for essential defense-supporting activities. This, in general, was the assignment given to the ODM Committee on Manpower Resources for National Security.

It is tremendously significant, therefore, that in its report the Committee recommended steps that constitute fundamental changes in our historical method of handling our military reserve forces. EMC, SMC, and other organizations and individuals concerned with problems or specialized manpower mobilization and utilization believe that the following recommendations included in the Appley Committee report reveal a growing awareness of a need for a new approach to our manpower mobilization problems:

1. The reorganization of our military reserve forces to provide for an immediately recallable reserve and a selectively recallable reserve.
2. The continuing screening of those in the immediately recallable reserve for occupational and other reasons.
3. Provision for expert advice to the agency charged with the responsibility of mobilizing the selectively recallable reserve.
4. In general, recall of specialized personnel only in accordance with demonstrated need.

WHERE DO WE GO FROM HERE?

There are certain important questions that the Appley Committee was not in a position to analyze—for example, the size of the immediately recallable reserve. This is largely a military matter which will have to be determined by the Joint Chiefs of Staff. There are other questions, also, that will have to be answered before a comprehensive and realistic reserve program can be adopted.

In a letter to the President, dated January 6, 1954, Arthur S. Flemming, the director of the Office of Defense Mobili-

	UNITED KINGDOM		UNITED STATES	
	Number	Percentage	Percentage	Number
CLASS I-A				
In service or accepted	1,122,500	63.6	29.5	2,684,085
Not examined	19,500	1.1	8.4	760,371
CLASS I-C and D				
Reserves, etc.	— —	—	17.0	1,550,804
CLASS I-O				
Conscientious Objectors	— —	—	0.03	3,353
DEFERMENTS				
Applied for	3,500	0.2	0.2	16,004
Student (statutory)				
High School	8,800	0.5	0.6	56,609
College	— —	—	0.1	6,999
Agricultural	72,300	4.1	0.9	81,899
Apprentice	132,900	7.5	0.1	6,785
Articled pupil	27,200	1.5	—	— —
Student (II-S)	39,400	2.2	1.8	164,951
Occupational	83,800	4.8	0.3	24,579
Others	11,400	0.7	12.8	1,164,895
CLASS IV				
IV-F	243,700	13.8	19.7	1,782,237
Others	— —	—	8.6	784,913
Total	1,765,000	100.0	100.0	9,088,484

zation, made recommendations based on the Appley Report. Following are several quotations indicative of the nature and tenor of the report:

". . . . .I make the following recommendations looking toward the ultimate presentation to the Congress of a comprehensive program which will strengthen our military reserve program and at the same time enable the civilian labor force to make its maximum contribution to our national security.

"1. That the National Security Council on the basis of recommendations by the Department of Defense determine the size and composition of military reserve forces needed in the light of current and future national security requirements.

"In planning intelligently for an age of peril, we must reach a determination as to the proper size and composition of our reserve forces promptly and accurately. This problem is as susceptible of solution as the problem of determining the size and composition of our active military forces. In every respect it is important to the nation's defense.

"2. That the Department of Defense prepare for the consideration of the National Security Council, a program for the establishment of an 'immediately callable reserve' and of a 'selectively callable reserve' each of appropriate size and composition.

"At present, there is no clearly identified category of reservists of adequate size and in a suitable state of readiness to meet the initial shock of a suddenly expanded need for military manpower. The Committee on Manpower Resources for National Security, in its report, emphasized the importance of a reserve which is instantly available. Members of this 'immediately callable reserve' should be subject to call, as units or as individuals, by the military services when authorized by the President or the Congress. It should be so organized and composed that no significant attrition would occur at the time of call because, for example, members of the reserve possess critical skills required in essential supporting research, development or production. The quality of training and incentives offered by the 'immediately callable reserve' should be of such a nature as to attract and retain an adequate number of men having a high level of military competence.

"As indicated by the Committee on Manpower Resources for National Security, the screening of an 'immediately callable reserve' should be continuous to ensure that it contains military skills in proper balance for effective execution of the required military missions. The screening should also assure that reservists who possess civilian skills of greater value to the national security than their military skills or who, for some other reasons, might not be available for an immediate call are removed from the 'immediately callable reserve' and placed in a selectively callable reserve.'

"The 'selectively callable reserve' should constitute an important resource for building up military strength to meet the needs of expanded mobilization. Members of this component, however, should be subject to selective recall, based on occupational, equity, and other factors considered on an individual basis.

"In its recommendations on the needed size of the reserve forces, the Department of Defense should specify the size and composition of the 'immediately callable reserve' and of the 'selectively callable reserve' needed by each of the military services.

"The Department of Defense should develop a plan for the call-up with the cooperation of the Department of Defense, Department of Labor, and the Selective Service System, should develop a plan for the call-up of members of the 'selectively callable reserve'. . .

"4. That, pending a determination of the size, composition and training of our reserve forces, we hold in abeyance any decision on the recommendations to put into effect the Universal Military Training provisions of the Universal Military Training and Service Act. . . .

"If you so desire, I shall arrange for the further consideration of the recommendations of the National Security Training Commission, the Committee on Manpower Resources for National Security and the recommendations in this communication by appropriate departments and agencies, including the Department of Defense, the Department of Labor, and the Selective Service System, and for the presentation of a paper on these matters to the National Security Council no later than April 1, 1954."

In reply, President Eisenhower wrote as follows on January 8, 1954:

"In general, I agree with the analysis contained in your letter of the sixth, of the pressing need to strengthen our reserve forces and with your recommendations as to the best way in which to approach the problem.

"I request, therefore, that you proceed with the preparation of a paper dealing with these issues and for its presentation to the National Security Council no later than April 1, 1954."

It is a pleasure for EMC and SMC to report, with some optimism, action within the Executive Department of the Government to formulate an over-all manpower mobilization plan, military and otherwise, in keeping with the requirements and limitations imposed by an age of technology. Further developments will be reported as they occur. Note: Italicizing by EMC-SMC.

ENGINEERING 3-2 PLANS

We have had several inquiries requesting more details on Engineering 3-2 Plans as a result of the short item on it in *Newsletter* No. 51. There is an excellent article on the plan in the December 1953 issue of *Higher Education* by Hen-

ry H. Armsby, Chief for Engineering Education, Division of Higher Education, U.S. Office of Education. *Higher Education* is a monthly publication of the U.S. Department of Health, Education, and Welfare, Washington 25, D.C.

In our item on 3-2 plans, we omitted, inadvertently, Lafayette College. The Lafayette plan, one of the most extensive in the Country, has twenty-three colleges associated with it and is giving evidence of real success for the liberal arts colleges, the students, and for Lafayette.

U.S.—GREAT BRITAIN SELECTIVE SERVICE COMPARATIVE DATA

In the December 1953 issue of *Selective Service* (Vol. 3, No. 12), a column is devoted to the draft in Great Britain, and the figures given permit some comparison with the Selective Service System in the United States. In the accompanying table, an effort is made to show the correlation between the British and U.S. systems of induction, and the result is especially interesting in its revelation of contrasts in the treatment of certain categories of eligible young men.

Superficially, there appears to be a marked difference between the percentages of those either accepted or actually in the service, but if those included in this Class I-C and Class I-D are added to those in service or available but not examined, the percentages are not too far apart — 64.7 for the United Kingdom and 54.9 for the United States. It will also be noted that the rejection rate is substantially lower in the United Kingdom than in this country, and even among those considered physically unfit the British eliminate only 13.8 per cent as contrasted with 19.7 per cent in the United States. In the absence of evidence that physical and mental health are in a worse state in this country than in Great Britain, we must conclude that our standards are so high as to warrant some re-examination and possible revision.

An analysis of deferments is also especially interesting. In Great Britain, the percentage of high school students deferred is essentially the same as in the United States, but there is a much higher proportion of university students (2.2 per cent as compared with 1.8 per cent in the U.S.). In the occupational categories, it is evident that the British are placing a much higher value on the maintenance of certain aspects of the national economy than we are. Agricultural deferments total 4.1 per cent as contrasted with 0.9 per cent; industrial deferments, which are weighed heavily in the mining and shipping fields, total 4.8 per cent as against 0.3 per cent. Of the 1,765,000 men available in the United Kingdom, the British have seen fit to defer 9 per cent in the apprentice and articled pupil categories, whereas we can point to only 0.1 per cent in this group, although it must be admitted that we have no counterpart of the articled pupil and have substantially smaller apprenticeship programs. Although the British are considerate in granting deferments in hardship cases, they have not made a special category of fathers, whereas this category contains over 8 per cent of the deferments in effect in the U.S.

Industrial Hygiene

(Continued from Page 5)

pilot controls have been the cause of many serious explosions and fires. Such ovens used in baking of japan or other drying or baking operations now usually have proper pilot flames but we still sometimes find one not so provided. Such control is an imperative requirement.

Wherever possible it is highly desirable that automatic controls be used. One example of this is a device set off by certain concentrations of explosive vapor or gas. This can operate a warning light or bell. Still better, where applicable, such a device can make the change necessary to control the source of the hazard.

Engineers would do well to note the suggested codes of the National Fire Prevention Association.

Specific Recommendations

1. Maximum use of automatic control devices relying to a minimum degree on maintenance
2. Interlocks
3. Audio and visual signaling devices
4. Major construction should not be carried on simultaneously with certain operations
5. Good housekeeping—appropriate to the hazard.
6. Effective education of all personnel as to nature and control of hazards.

Ohmart Develops Atomic Battery

An "atomic battery," a new refinement of our atomic society, has now been developed by the Ohmart Corporation of Cincinnati, Ohio. This device, possessing far-reaching potentialities in industry and home, is already perfected to a point where it delivers a small current for almost an indefinite period of time—enough to run a very small electric motor for possibly 20,000 years. The discovery is based upon a method of converting radioactive energy directly into electrical energy.

Primarily a metrological tool at this stage of its development, the "atomic battery" plays an important part in the manufacture of new instruments for precise measurement of radioactivity. It can also be used to measure liquid levels, liquid interfaces, specific gravity, temperature, viscosity, pressure, and vacuum. Further possibilities, much different, exist for such functions as measurements of corrosion rates and analyses of alloys and gases.

Great potentials for the atomic battery are visualized for the near future. Fractional H.P. motors, electrical equipment, and instruments may be freed of dependence on power distribution lines and wiring. The new vista is for electrical apparatus—complete with a built-in energy source.

Philip E. Ohmart, president and director of research of the Ohmart Corporation, Cincinnati, Ohio, is the inventor of the battery. It was he who evolved a method of utilizing radioactivity in the generation of electrical energy. His theory, which makes use of a gas as an electrolyte after ionizing it by exposure to nuclear radiation, was developed during his work as leader of a research group at the Mound Laboratory in Miamisburg, Ohio.

It had been found that a cell with electrodes of lead and gold—far apart on the electromotive series—delivered a small current when the air surrounding them was exposed to radiation from as little as 25 millicuries of radium. When the pole connections were reversed, the current likewise reversed *its* direction This showed that the electrical current being generated in the cell, with a gaseous electrolyte, was a result of radioactivity. To check this theory, an airtight cell was built. As this cell was evacuated, the current dropped steadily. Upon further evacuation, the current fell to zero. And when a high degree of vacuum was established, a negative current resulted!

After the initial work with lead and gold as electrodes, 'Aquadag,' a dispersion of colloidal graphite in water, made by Acheson Colloids Company, Port Huron, Mich., was found to be more suitable as the positive electrode because graphite is beyond gold on the electromotive series. Other forms of carbon were tested but the highest positive potential for this type of electrode is produced by the colloidal graphite. The Aquadag electrode is also one of the most stable of all electrodes tried. Thus, Aquadag made possible the improved Ohmart cell now in use.

The Ohmart cell makes possible a battery for use where only a trace of current is needed. This "atomic battery" marks the first new method for making electricity in approximately fifty years. It is the fifth practical means for producing current, the others being the generator, the electrolytic cell, the thermocouple, the Kelvin-Null method of contact-potential measurement ("contact difference of potential"), and the Ohmart cell.

A Challenging Century

(Continued from Page 8)

In the keeping of Illinois Tech and its sister institutions lies much of the nation's future advance in basic knowledge, in application in technological forms, in the training of scientific personnel, and in helping further a real comprehension of the American way.

Much of what we already know can be found somewhere in books, technical journals, and scientific papers.

What we do *not* know, but must find out, is still locked up in the heads of those now in institutions such as IIT, and in the young men and women in the generations to come who will follow them.

Fortunately, in the United States we have no great state-imposed plan either for education or anything else.

We do have planning, however, where it counts most in a free society—in the private institutions of learning and in private industry.

As a private institution, Illinois Tech has drawn up an inspiring set of plans for its future.

They are aimed at rendering the greatest possible service to business and industry . . . in this area . . . and far beyond.

Over a half century ago, in 1892 in Chicago here, the commissioner for the World's Fair, Daniel Burnham, made a statement that, as I look ahead, has perhaps more meaning for our time and the future of our institutions than when he first uttered it. He said:

"Make no little plans. They have no magic to stir men's blood, and probably themselves will not be realized.

"Make *big* plans. Aim high in hope and work, remembering that a noble plan, once recorded, will never die, but long after we are gone will still be a living thing, asserting itself with ever-growing insistency."

Plans like that are the only kind with which we can meet the tremendous challenge of the future. With properly trained people, motivated by high aims, it can be done.

The real answer to making a fuller life for 50 million more citizens is that it *can* be done because it *must* be done. This nation has risen to challenges as great as this one in the past; I am convinced that we can do it in the future.

Crerar Library

News and Notes

As do other large libraries, Crerar frequently receives offers of books and magazines from persons reducing the size of personal libraries. While all such gifts cannot be accepted, due to the large amount of duplication, many desirable items do come into the collections in this way. A recent example of this generosity consists of some 50 volumes of 18th, 19th, and 20th century titles of much historical interest. Donated by Mr. Ernest Thiele of Chicago, numerous biographies and sets of memoirs relate to scientists important in the development of astronomy, chemistry, and physics. The provision of a list previously checked for duplicates made the cartage of such materials unnecessary, and the transaction as a whole was representative of many such offers for which the Library is grateful.

On exhibit in the Medical Department is a collection of babies' feeding bottles and medicinal spoons loaned by Drs. George Eisenberg and Louis D. Minsk, Attending Physicians of Children's Memorial Hospital. Although not strictly of engineering significance (except perhaps to esoteric hydraulics consultants), the display contains examples dating from 400 A.D. to the present, of pottery, pewter, silver, glass, and other materials. In addition to its general human-interest appeal, the exhibit is closely related to the Library's extensive collections on pediatrics.

In cooperation with the Library School of the University of Texas, Crerar has recently established an internship for the training of librarians. Previously encountered only in the course prescribed for medical librarians by certain schools, the present program looks toward practical, on-the-job instruction of students who have completed course work for the degree in librarianship; the eleven months interneship completes the requirements. Work assignments of one or two months in each department have been scheduled for the first participant, Mr. Roger Martin. With a B.S. in Chemistry and technical experience, Mr. Martin is expected to contribute to the Library's services while rounding out his professional qualifications.

Many visitors toured the Library during the recent midwinter meetings of the American Library Association, held at the Morrison Hotel. Among other eminent callers Crerar welcomed Mr. Frank C. Francis, Keeper of Printed Books at the British Museum. Mr. and Mrs. Francis joined several of the Library staff for a very enjoyable luncheon in the new W.S.E. dining room.

Industrial Hygiene Specialists to Talk

More than 100 specialists in different phases of industrial hygiene will speak before the meeting of the American Industrial Hygiene Association, which will be held April 26 to 29, as a part of the 1954 Industrial Health Conference, at the Hotel Sherman in Chicago.

High point of the meeting will come Wednesday and Thursday, when concurrent sessions will touch on over 50 different aspects of air pollution, chemistry and analysis, engineering, rediation and toxicology. Experts in these fields will share their knowledge with the hygienists.

Engineers Consider Sun Energy

Man, most resourceful creature in the universal scheme of things, must use his talents to develop new sources to replace the heat and power stored in the earth for innumerable eons, or he has only slightly more than a century and a half to survive. This contention prompted two ASHVE members to thoroughly consider the availability and use of solar energy.

Professor R. C. Jordan, head of the Department of Mechanical Engineering of the University of Minnesota, and J. L. Threlkeld, associate professor of Mechanical Engineering at the same institution, have completed a comprehensive report on the subject. Their writings were the result of extensive research sponsored by The American Society of Heating and Ventilating Engineers in cooperation with the Department of Mechanical Engineering of the University of Minnesota. The authors made their report in three technical papers presented at the 60th Annual Meeting of the ASHVE on January 27, 1954, in Houston, Tex.

Professors Jordan and Threlkeld state that petroleum deposits, accumulating in the earth for the past 500,000,000 years, and coal, the result of 250,000,000 years storage, will be depleted in approximately 160 years. Since man, in the last 53 years, has consumed more than 85 percent of all the fossil fuels used, a new inexhaustible source of energy like the sun is necessary.

The first paper, titled "Solar Energy Availability for Heating in the United States," shows calculations made of distribution of solar radiation available in this country on variously oriented surfaces. They include cases outside the atmosphere, at the earth's surface during cloudless days, and during all days. Discussions are made of the earth's position relative to the sun, solar constants, and depletion of radiation by the atmosphere. The superiority of a south-facing surface for interception of winter sunshine is shown. An analysis was made from records at Blue Hill, Mass.; Madison, Wis.; Lincoln, Neb.; Nashville, Tenn., and New Orleans, La.

"Utilization of Solar Energy for House Heating," the second paper, deals with methods of utilizing solar energy for house heating. Detailed are the many major components of energy-heat pump systems. Possible paths for energy flow are indicated. Types of collectors of solar energy, and the optimum number of glass panes for a flat-plate type collector are determined for various sections of the United States. Efficient storage of solar energy is considered, and sufficient heat and heat of fusion methods are compared. Also discussed, is the application of heat pumps to year 'round air conditioning.

The third paper, "Design and Economics of Solar Energy Heat Pump Systems," supplies necessary information about house construction and design for use of the new heat source. System requirements are listed, and methods of designing heat collectors for Madison, Lincoln, and New Orleans, cities in different temperature zones. Also covered are the ranges of temperature conditions for which solar heat installations may be considered.

Pertinent facts were presented for building and heating a model house in Lincoln, a locality having rather severe winters. It was determined that a house designed for a heat load of 62,000 Btu per hr. can be heated during variable winters by a system equipped with a 700-sq. ft. collector, a 4-hp heat pump, and a heat storage facility using 400 cu. ft. of a heat of fusion material.

In many localities solar energy heat pump systems would result in lower heating costs than conventional fuel-fired systems. Substantially lower heating costs were established in Madison and Nashville. No serious architectural problems exist in providing for solar energy storage.

Chicago Area Leads in Contracts

The Chicago Metropolitan Area led all other comparable regions of the country in both the number and value of contracts awarded for the construction of large manufacturing plants during the past eight years.

This is disclosed in a survey made by the territorial information department of Commonwealth Edison Company and its Public Service Company Division. The study is based on a tabulation of plant construction contracts as reported by Engineering News Record covering the period from July 1, 1945, through June 30, 1953. It includes only contract awards exceeding $100,000 in value.

The Chicago area in the eight-year period had 454 large contract awards, with a value of $503,426,000. The Los Angeles area ranked second in number of contracts with 182, but the Philadelphia-Camden area was second in the total value of contracts with $482,934,000.

Armour Develops Ceramic Unit

A new lightweight, all-ceramic building block which possesses many advantages over the common cement block has been developed by Armour Research Foundation.

Perfected by the Foundation's Ceramics and Minerals Research department in a project sponsored by the Arabian American Oil company, New York City, the new building unit promises to solve the problem of low-cost housing in Saudi Arabia.

It also may prove to be an economical construction material for use in the United States, according to John Neff, assistant manager of the Ceramics and Minerals Research department.

The new block which is entirely ceramic and contains no portland cement, is composed largely (90 per cent) of bloated clay, bonded with fused clay. It is a standard size, 8″ x 8″ x 16″, three-cavity block.

Among the superior features of the new building unit, Neff outlined the following:

—Light weight. The block weighs only 22 pounds, considerably less than most cement-bonded blocks. It may be handled easily by one man.

—Highly insulative. The unit has a conductivity of 0.3 BTU or less per square foot of wall area. This feature allows the block to keep out the heat or cold, as the climate may require, and is of particular value where air conditioning is a factor.

—Permanent. The block will not crumble or chip.

—Load bearing. It has a compressive strength of 1,000 pounds per square inch.

—Porosity. Because of a 12 to 16 per cent porosity, walls of this material "breathe" and will not sweat.

—Aesthetic appeal. The unit may be produced in a variety of colors ranging from buff to dark maroon. As with any ceramic material, the color is uniform throughout. The various colors available, plus the mottled surface of the block, give it an aesthetic appeal for both interior and exterior walls.

—Cutting, trimming, nailing. Because of its fine-pore structure, the block may be easily cut or trimmed. Nails can be driven securely into them, thus eliminating "nailing blocks" which must be used with cement units.

—Acoustical properties. The unit has good sound absorbing qualities.

The new building block was developed by ARF scientists from Arabian clay. The clay is converted into a bloated aggregate by heating on a fixed grate, a traveling grate, or in a rotary kiln. The aggregate is then crushed and graded and the various grain sizes recombined to produce the desired working properties and finished product characteristics.

Raw clay, which may be the same as that from which the aggregate was made, is then added to the graded aggregate. From 10 to 30 per cent of the mixture is raw clay. Water is added, and the batch is mixed in a concrete mixer.

The blocks are molded in an ordinary concrete block machine. Finally, the blocks are fired, or matured, in a tunnel kiln by conventional ceramic methods.

Work in developing the new building unit was begun at the Foundation in 1952. The Arabian American Oil company sought an economical unit which could be produced in Arabia from native materials, thus avoiding the high cost of importing structural clay products, portland cement, and steel.

While the resulting block promises to do just that, Arabian American and ARF officials believe that it also offers potentialities as an economical building unit for both residential and commercial construction in the United States. In this country, domestic clays would be used to produce the block.

Research Services Explained in Booklet

"Scientific Sleuthing," a new booklet just published by Armour Research Foundation of Illinois Institute of Technology, Chicago, describes the Foundation's expanded literature research services available to industry.

The ARF literature research section offers technical, patent, and economic surveys of all magnitudes; surveillance of current technical information; and bibliographies, abstracts, and translations.

Organized five years ago as a facility of the ARF chemistry and chemical engineering research department, the literature searching service later was expanded to serve the entire Foundation. The service proved so successful internally that it is now offered to industrial sponsors.

Copies of the descriptive brochure, "Scientific Sleuthing," may be obtained by writing to Armour Research Foundation of Illinois Institute of Technology, Technology Center, Chicago 16, Illinois.

WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

124-53 Richard M. Lucas, Structural Engineering, Link-Belt Company, 300 W. Pershing Rd.

125-53 George Joerger, Mechanical Engineer, DeLeuw, Cather & Company, 150 N. Wacker Dr.

126-53 Evan J. McIlraith, Associate, Griffenhagen & Associates, 333 N. Michigan Av.

127-53 John F. Kausal, Partner, Pace Associates, 53 W. Jackson Blvd.

128-53 Michael M. Mattern, Draftsman & Student Assistant, Armour Research Foundation, 35 W. 33rd St.

129-53 Joseph J. Andrews, Design Engineer, Acme Steel Co., Riverdale Station.

130-53 Philip E. Rinck, Design Engineer, Acme Steel Co., Riverdale Ill.

131-53 George L. Zanetti, Layout Man, Link-Belt Co., 300 W. Pershing Rd.

132-53 William B. Cobb, Partner, Pace Associates, 53 W. Jackson Blvd.

133-53 Charles R. Shupe, Chief of Gen'l. Plan'g. Dept., DeLeuw, Cather & Company.

134-53 Harry S. Morgan, Partner, Consoer, Townsend & Associates, 351 E. Ohio St.

135-53 Harold A. Schmidt, Secretary & Treasurer, Independent Boiler & Tank Co., 1249 N. Clark St.

136-53 Herbert Eck, Jr., Starting Engineer, Commonwealth Edison Co., 72 W. Adams St.

137-53 Albert A. Goers, Chief Site Planner, Pace Associates, 53 W. Jackson Blvd.

138-53 K. T. Brusa, Proj. Engr., Engineering Construction Corp., 173 W. Madison St.

139-53 Edwin R. Cline, Vice President, Engineering Construction Corp., 173 W. Madison St.

140-53 C. R. Edmonds, President, Engineering Construction Corporation, 173 W. Madison St.

141-53 Henry Pfutzenreuter, Jr., Project Engineer, Engineering Construction Corp., 173 W. Madison St.

142-53 Ken R. Grearson, Sales Engr.—Chicago Dist. Office, Granco Steel Products Co., 122 S. Michigan Av.

143-53 Olaf O. Roberts, Dist. Sales Engr. — Chicago Dist. Office, Granco Steel Products Co., 122 S. Michigan Av.

144-53 Oliver P. Luetscher, Jr., Sales Engineer, H. H. Robertson Co., 221 N. LaSalle St.

145-53 H. W. Smith, Works Manager, Street-Amet Co., 4101 Ravenswood Av.

146-53 John Taylor, Vice President, Lester B. Knight & Associates, 600 W. Jackson Blvd.

147-53 Ellsworth F. Bentley, General Manager, G & W Electric Specialty Co., 7780 Dante Av.

148-53 Robert E. Boyle, Application Engineer, G & W Electric Specialty Co., 7780 Dante Av.

149-53 Leo J. Dylewski, Assistant Sales Mgr., G & W Electric Specialty Co., 7780 Dante Av.

150-53 Dean C. Harrison, Development Engineer, G & W Electric Specialty Co. 7780 Dante Av.

151-53 George E. Lusk (Rein.), Assistant Elect. Engr., G & W Electric Specialty Co., 7780 Dante Av.

152-53 Clyde W. Shade, Mechanical Engineer, G & W Electric Specialty Co., 7780 Dante Av.

153-53 John F. Baker, Jr., Engineer, American Asphalt Paving Co., 9701 Torrence Av.

154-53 James H. Nicholas, Chief Engineer, G & W Electric Specialty Co., 7780 Dante Av.

155-53 C. W. Sward, Vice Pres. & Sales Manager, G & W Electric Specialty Co., 7780 Dante Av.

156-53 Pearson F. Williams, Pres. & Chairman of the Board, G & W Electric Specialty Co., 7780 Dante Av.

157-53 Nelson D. Barnett, Chief Draftsman, William A. Baehr Organization, 231 S. LaSalle St.

158-53 Henry J. Majcher, Mechanical Engineer, Automatic Electric Co., 1033 W. Van Buren St.

159-53 Lester B. Knight, President, Lester B. Knight & Associates, Inc., 600 W. Jackson Blvd.

160-53 Edgar E. Ballard, Chief Engineer, Lester B. Knight & Associates, Inc., 600 W. Jackson Blvd.

161-53 Donald A. Loughridge, Dean, Technological Institute, Northwestern University, Evanston, Ill.

162-53 Frederick A. Freiberg (Rein.), Senior Structural Engineer, Sverdrup & Parcel, Inc., 915 Olive St., St. Louis, Mo.

163-53 Fred W. McCloska, Electrical Engineer, Sargent & Lundy, 140 S. Dearborn St.

164-53 Leo F. Rehm, Consulting Engineer, Consoer. Townsend & Associates, 351 E. Ohio St.

165-53 Kenneth D. Knoblock, President, Wisconsin Southern Gas Co., Lake Geneva, Wis.

166-53 Thomas Donaldson, Application Engineer, I-T-E Circuit Breaker Co., 105 W. Adams St.

167-53 Gerald M. Marks, Lighting Dept. Mgr., Electric Supply Corp., 701 W. Jackson Blvd.

168-53 W. E. Guy, Central District Manager, Graybar Electric Co., Inc., 850 W. Jackson Blvd.

169-53 Lee D. Garnett, Application Engineer, I-T-E Circuit Breaker Co., 105 W. Adams St.

170-53 Roy H. Holmquist, Manager of Lighting Sales, Graybar Electric Co., 850 W. Jackson Blvd.

171-53 Selden K. Adkins, Director Tech. Service, Boiler Feedwater, National Aluminite Corp., 6216 W. 66th Pl.

Personnel Service Gives Report

The Chicago Advisory Committee of Engineering Societies Personnel Service, Inc., report that the starting salaries of the engineers placed through the Service by the Chicago office in 1953 totaled $1,013,686.00 This figure was accomplished in spite of the acute shortage of engineers available for the many positions open to them. The average starting salary for all types and levels of engineers was $6,670.00.

It is also reported that there are about fifteen positions open for every man available but the men must be able to qualify for the positions before companies will employ them and the shortage of men does not mean that companies will hire men just because they have engineering degrees.

The Committee also announces its new officers for 1954. These men are: Lemuel J. Dunlap of Westinghouse Electric Corporation and represents the American Institute of Electrical Engineers; Vice-Chairman, Major Adolph Langsner of Northwestern University and a consulting engineer who represents the American Society of Mechanical Engineers; Treasurer, A. L. R. Sanders, MWSE, of Hazelet & Erdal, who represents the American Society of Civil Engineers; and Secretary, Bonnell H. Allen, Chicago Manager of Engineering Societies Personnel Service, Inc.

These men were installed by Alfred H. Meyer, Executive Director of E.S.P.S. at the Annual Chairmen's Meeting on February 25 at the Western Society of Engineers. Ernest Hartford of American Society of Mechanical Engineers and President of E.S.P.S. for 1954, presented a certificate of appreciation to Virgil E. Gunlock, MWSE, Junior Past Chairman of the Chicago Advisory Committee at the same meeting.

The chairmen of the local sections of the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Institute of Electrical Engineers, and the American Institute of Mining and Metallurgical Engineers and the presidents of Western Society of Engineers and the Chicago Chapter of the Illinois Society of Professional Engineers were invited to attend the meeting.

The Chairmen of C.A.C. E.S.P.S. in recent years have been: Virgil E. Gunlock, 1953; J. N. Stanbury, 1952; John F. Seifried, 1951 and Dean O. V. Eshbach in 1950.

Plans were discussed to extend the Service to more engineers for 1954. E.S.P.S., a non-profit Service for engineers was established in 1918.

Welders Will Meet

The fourth conference on Electric Welding under the sponsorship of the American Institute of Electrical Engineers in cooperation with the American Welding Society, has been scheduled for Milwaukee, Wis. on May 19, 20 and 21 at Hotel Schroeder. The conference is being arranged by the AIEE Committee on Electric Welding. A full program of papers on electric welding and inspection of welding processes in Milwaukee plants will feature the three day meeting.

Inventors to Have Conference

The nation's inventors will have an opportunity to make a bid for a profitable recognition of their "brain children" at an Invention Exhibit & Conference to be held Monday, May 3 at the Cleveland Engineering Society.

Prompted by the lack of a common meeting ground where inventors and industrial leaders can get together, the 74-year old engineering organization is sponsoring the Exhibit & Conference as a mutual service and to stimulate invention.

In addition to an exhibit of operating and non-operating units or models which are available for leasing, licensing or sale, an afternoon and evening program of informational talks on invention will be given.

Inventors having a practical product or process were invited to submit patent papers, or resume, and a commercial description, if available, to the Invention Conference Group of the Cleveland Engineering Society not later than April 1. Non-patented items were not acceptable for consideration unless submitted with a disclosure form obtainable from the Society.

In judging entries the conference group will use as their yardstick for a "practical product or process" that it (1) definitely should fill a specific human need, whether it is to be used directly by the consumer or in the production of products or services; (2) should be clearly better than other comparable products or processes and not merely an alternative; (3) should have its research development completed so that it is ready to be put into production; (4) should preferably be one which can be readily sold through existing sales or merchandise channels; and (5) the potential market should be large enough in size and the difference between the cost and the sales price should be great enough so that substantial profits may be expected to compensate for the investments of effort, time and money necessary to put the invention on the market and defend it against competition.

The conference group will also be interested in knowing if the item is available as a full scale unit or as a model and whether it is operating or non-operating.

All material to be considered for review was to be submitted in writing to the Invention Conference Group of the Cleveland Engineering Society, 2136 East 19th St., Cleveland 15, Ohio, not later than April 1.

Inventors were cautioned not to send original patent papers since all material submitted would not be returned but would become the property of the Society to be deposited in its library.

There are no entry fees connected with the exhibit. Visitors wishing to attend the Invention Exhibit & Conference must pay a $5 registration fee which will include the exhibition, meetings and dinner at the Society building.

In addition to the exhibit of a number of selected inventions, ideas and processes, there will be a program covering such phases as "Technique of Invention," "Fitting an Idea into Production," "Fitting an Idea into Marketing," "The Future of Invention in Industry," and "The Manufacturer Looks to Invention."

The Invention Exhibit & Conference is planned as a market area for buyers and sellers of inventions, ideas and processes. It will provide a place for people to bring their creations to be seen by people who can use them. For organizations seeking items which they can build or use, it provides an opportunity to see many items in one convenient place. For other organizations it will be a place to exhibit items they have available for leasing, licensing or sale.

Education Society To Hold Meeting

The American Society for Engineering Education will hold its 62nd Annual Meeting June 14-18, with the University of Illinois as host institution. Dr. Lloyd Morey, the University's acting president, will extend its welcome at a general session June 15. At that time the other main speaker will be the ASEE national president, Dean Linton E. Grinter, MWSE, of the University of Florida.

Stressing the evaluation of engineering education and its prospective functions during the next two decades, the Annual Meeting will take up such matters as improvement of teaching, recognition of good teaching, accreditation of engineering colleges, professional status of engineers, and the interrelations of university, industrial, and governmental research.

Besides four general sessions and the annual banquet, more than 80 conferences—several of them joint sessions—will be held by the Society's seventeen divisions.

On Training—
Letters from Leaders

In the last issue of Midwest Engineer we published another of about thirty letters received from leaders of Chicago-area firms concerning shortcomings noted in the engineers in their employ. Many of the letters also suggested what the engineers should do to correct their deficiencies.

Significantly, the engineer's technical training is generally considered adequate. In the broad area of Human Relations, however, engineers seem often to be "under achievers," according to the viewpoint of the industrial leaders as reflected in their letters.

We are printing another of these letters in this issue, as we shall do in future issues. Although the letters may be of greatest value to the younger engineers, we hope that all of the engineers who read them will benefit.

Here, then, is the next letter:

Dear Mr. Becker:

Your letter of August 31 to our Mr. A . . . . . has been forwarded to me for answer. I am quite certain that most companies experience the same amount of difficulty as we do in trying to obtain engineers who are capable of supervising engineering work and who can ultimately advance into executive engineering positions. Although many engineers are available, very few have the ability to become supervisors or executives. I believe that part of this can be corrected by proper education and, therefore, I will do anything I can to assist you.

It is our experience that engineers coming out of our universities have been technically educated but the majority of them do not have the approach that is required for the proper application of their technical education. The biggest single factor that seems to limit the usefulness of our best educated engineers is lack of initiative. I do not know if it is possible to instill initiative into a student by education alone; but if the educators believe that it can be done, then a course or series of courses designed to increase the engineer's initiative should be a part of every engineer's education.

It is true that some of our engineers have technical ability and initiative but are somewhat hindered by lack of personality or lack of business sense. However, these two characteristics, even taken together, are much less important than initiative. I believe that every engineering student should be required to study some business courses. These should certainly include Accounting and Management and Organization.

It is also my opinion that the type of training and the method in which it is given to our engineering students is such that it has a tendency to reduce the effectiveness of their personality rather than to enhance it. I do not know what can be done to correct this condition but some sort of change is necessary.

There is one other weakness which seems to stand in the way of advancement of some engineers who are well trained and who have outstanding personality and initiative. That defect is the lack of ability to organize their thinking. They seem to be able to accumulate facts but cannot evaluate the facts and arrive at a clear decision based on those facts. I believe it is because they do not think in an orderly fashion.

From my above comments, you will realize that I am quite critical of the type of engineers that are available today. I am very much interested in what steps might be taken to correct this condition, and will appreciate knowing what action will be taken by the Western Society of Engineers.

Very truly yours,

Electric Customers Number 50,000,000

Somewhere in the United States last January 28, during the hour from 12 noon to 1 p.m. (Chicago time), America's 50,000,000th electric customer began getting service.

The Edison Electric Institute has calculated that approximately 600 additional customers were connected throughout the country during that hour and one of them was the 50,000,000th to get service. Exactly who the 50,000,000th customer is will never be known, as it was not practical to work out a method for determining it.

This milestone has special significance at this time because 1954 is being observed as Light's Diamond Jubilee in honor of the invention 75 years ago by Thomas A. Edison of the first practical incandescent lamp.

Potentially, the 50,000,000th customer could have been one of about 20 to 25 customers the Commonwealth Edison Company and its Public Service Division anticipated would be added to the system during the designated hour. The Commonwealth system is adding approximately 170 customers daily. The increase in 1953 totalled 42,362.

A national committee is now setting up a program for observation throughout 1954 of Light's Diamond Jubilee. Willis Gale, chairman of Commonwealth Edison Company, is the committee member from the Chicago area.

WSE Personals

Milton S. Aronstam, MWSE, director of safety, Material Service Corp., has been appointed to The President's Conference on Occupational Safety, and a member of the committee on community safety program. The appointment is effective to Sept. 1, 1955.

Richard Wessling, MWSE, formerly vice-president and director of Electric Supply Corporation of Chicago, Aurora, Hammond, and Milwaukee, has been appointed District Manager of the Chicago office of the Allen-Bradley Co., electric control manufacturers of Milwaukee, Wisconsin. He succeeds John McC. Price, former district manager, who has retired from active service. Wessling was graduated from Cornell College, Mt. Vernon, Iowa, in 1937 with the degree of B.S. in general science. He did postgraduate work in mathematics at Colorado College, and in electronics at the University of California.

Following his basic college training, Wessling spent a year with General Electric Company in sales engineering training. He later joined Electric Supply Corporation and was advanced to the position of sales manager in 1943. From 1944 to 1946 he served as electrical engineer at the Naval Air Base at Alameda, California, returning to Electric Supply Corporation as sales manager in 1946. He became vice-president and a director in 1947.

Wessling is a member of the American Institute of Electrical Engineers, Association of Iron & Steel Engineers, Illuminating Engineering Society, and Electric Maintenance Engineers Association.

Soiltest, Inc., Chicago, manufacturer of soils and concrete test apparatus, has announced the appointment of M. D. Morris of New York City as the Eastern Representative.

Morris is an associate member of the American Society of Civil Engineers and is a member of the Society of Military Engineers. He has been associated with Soiltest, Inc. for the past five years in a sales engineering capacity. His offices are located at 545 Fifth Avenue, New York 17, New York.

Dr. Gustav Egloff, MWSE, was scheduled to leave on March 23 to attend the American Chemical Society meeting in Kansas City, Mo., and to address the Kansas City University, the South Kansas City Business Club, and William Jewell College on March 25. His schedule called for him to make two radio broadcasts on March 26. Plans also called for him to make a television appearance.

He was to leave on March 28 for San Antonio, Tex., to attend the Western Petroleum Refiners Association meeting of March 29-31.

Dr. Egloff's itinerary called for his leaving San Antonio on April 3 to go to Tulsa, Okla., to give on April 5 an early-morning interview to Andrew Rowley of the Tulsa Tribune and make a broadcast with him over Station KVOO that afternoon, also a terevision broadcast over Station KCEB. In addition, on April 5, Dr. Egloff was to address an evening class at the University of Tulsa. The class is known as "The Oil Industry through Visual Education," and is comprised of 300 oil company employees.

On April 6 Dr. Egloff was to go to Bartlesville, Okla., to give a brief talk before a dinner meeting of the Desk and Derrick Club, this to be followed by an address before a group meeting consisting of the Desk and Derrick Club, the Engineers Club, the American Institute of Chemical Engineers, and American Chemical Society, and the local town hall group.

Section Committees Make Nominations

The nominating committees of the following sections have selected two members each as the regular ticket for directors of their section. The terms will be for three years beginning June 1, 1954.

Nominees for the Bridge and Structural Engineering Section for the election to be held on May 4: John A. Lewis and Frank H. Wells.

For the Chemical and Metallurgical Engineering Section, election date to be announced later: Milton S. Aronstam and Lester Crown.

For the Hydraulic, Sanitary, and Municipal Engineering Section, the election to be held on April 12: Baldwin C. Eilers and William J. Santina.

For the Traffic Engineering and City Planning Section, the election scheduled for May 12: John G. Duba and Charles S. Michalski.

For the Transportation Engineering Section for the election to be held on April 14: Charles E. Godfrey and Charles W. Ricker, Jr.

Huge Oxygen Unit in Operation

The only one of its kind in Canada, a tonnage oxygen unit for production of vast quantities of oxygen required for the direct flash smelting of copper concentrates has been placed in operation at Copper Cliff, Ont., by the International Nickel Company of Canada, Limited. Inco's new oxygen flash smelting process eliminates the fuel normally required for smelting and makes economical the present large-scale output by Canadian Industries Limited of liquid sulphur dioxide from furnace exhaust gases.

International Nickel's operations call for a volume of more than 7,500,000 cubic feet of oxygen every day—enough to fill 32,000 standard cylinders. The company's oxygen plant produces 300 tons of 95 per cent pure oxygen every 24 hours.

The oxygen plant known as "Oxyton," separates the oxygen from atmospheric air by the liquefaction process, using the same basic principles involved in smaller commercial oxygen plants. The air is liquified under pressure in a series of compressors, regenerator-heat exchangers, distillation columns and other equipment. Finally, the oxygen is separated from the other constituents of the atmosphere—nitrogen, argon, neon and krypton. In gaseous form, the oxygen is then carried in a 16-inch diameter elevated pipeline from the Oxyton to the smelter, a distance of 6,000 feet.

As temperatures as low as several hundred degrees below zero are involved in the liquefaction process, special consideration had to be given to the types of metals and other materials employed in certain parts of the oxygen generating unit. For example, the important regenerator-heat exchanger system consists of two nitrogen regenerators, each eight feet in diameter and 17 feet long, and two oxygen regenerators, each four feet in diameter and 14¾ feet long.

While one pair of regenerators chills the incoming air, the other pair is being chilled by the separator gases. Working temperatures range from 80 degrees Fahrenheit to minus 280 degrees. Since most ferrous metals suffer a marked increase in brittleness at sub-zero temperatures, the regenerators were made from special 8½ per cent nickel steel, developed for low temperature use.

Despite its size and intricacies, the operation of the Oxyton is essentially automatic, once the liquefaction process has been started. Control and metering are carried out by modern electronic equipment with over 40 control instruments centralized on a huge operating panel—the nerve center of the plant.

The far-reaching possibilities of large-scale oxygen applications in metallurgical and chemical industries have been recognized within recent years by leading research scientists. Their studies lead to the conclusion that oxygen, employed in tonnage volumes, will transform many present industrial processes within the next generation.

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An engineer went into a drug-store and asked for a dozen two-grain quinine capsules.

"Do you want me to put them in a bottle?" asked the clerk as he counted them out.

"Of course not," said the engineer, "I'm going to roll them home."

British Expert Speaks on Concrete

A British expert in civil and structural engineering presented two lectures at Illinois Institute of Technology on March 11 and 12.

The visit by Paul William Abeles was sponsored by IIT's department of civil engineering. A member of the civil engineering department of the British Railways since 1944, Abeles spoke on the general topic of prestressed concrete.

Structural engineers and others interested in Abeles' lectures were invited to attend at 7:30 p. m both days in the auditorium of the Chemistry building, 33rd and Dearborn streets, Chicago.

The English engineer has been in the United States since early February and will stay until late April. During his stay, he attended the Denver convention of the American Concrete Institute on Feb. 23-25 and is giving talks at a number of leading colleges and universities, including the University of California, Ohio State university, Georgia Tech, and Cornell university.

Abeles' lectures at Illinois Tech was a return visit since he presented several talks while at the Institute last year.

Abeles, who was educated at the Technological University in Vienna, has conducted extensive research in concrete.

He received a civil engineering degree in 1922 after a five-year course and a Doctor of Technical Science degree in 1928. Abeles was a consulting engineer in Vienna from 1929 to 1939 and became a consultant in civil and structural engineering in London in 1941.

Obituaries

The Western Society of Engineers has recently been notified of the following deaths:

Roy M. Brazelton, who had been ill for some time, died November 14, 1953. He had been a maintenance engineer for a number of years with the Illinois Bell Telephone Company. More recently he was acting assistant chief engineer. Mr. Brazelton had been a member of the Western Society since 1947.

Duncan M. Campbell, chief engineer with the Cook County Highway Department, died on November 24, 1953. He had been a member of the Western Society since 1950.

Leroy F. Harza, president of Harza Engineering Company, passed away on November 22, 1953. Private services were held for him in the chapel at 1913 Sheridan in Highland Park, Illinois. Mr. Harza taught mathematics and hydraulic engineering before organizing his own company more than 30 years ago. Besides having degrees in civil and mechanical engineering, he had received an honorary doctor of engineering degree from the South Dakota State College. He had written a number of articles for technical publications. Besides his association with the Western Society of Engineers which began in 1924, Mr. Harza was a member of several national engineering societies.

LeRoy K. Sherman, Life Member of the Western Society since 1938, died in his sleep on January 5, 1954. He had first become a member of the Society in 1895. For many years Mr. Sherman had been a consulting hydraulic engineer. Recently he had lived in San Diego.

Thirty Discuss Solid State Science

Thirty leading engineers and scientists gathered at the University of Illinois on March 8, 9 and 10 to discuss whether work in solid state science should be introduced into the undergraduate program of American engineering colleges. The conferees represented both education and industry.

This meeting will be followed by sessions June 21-26 at the Carnegie Institute of Technology. There 150 engineering educators will discuss the conclusions reached by the working panel at the University of Illinois. Details of the June meeting will be announced within six weeks.

Similarly, Columbia and Northwestern Universities will team up on a program for nuclear science studies. The working panel and the general session on this subject will follow those on solid state studies by about two months.

Cooperating in both programs are the American Society for Engineering Education and the National Science Foundation. The Foundation has granted $15,200 to finance the essential expenditures incurred in the programs.

Organizing committee for the March conference was composed of Professors Frederick Seitz (chairman) and John Bardeen of the University of Illinois; Professor Arthur B. Bronwell of Northwestern, Secretary of the ASEE; Dean J. E. Goldman and Professor John W. Graham Jr. of Carnegie Tech; and Dr. Ralph E. Morgen of the National Science Foundation.

Secretary for the March conference was Professor Glenn Murphy of Iowa State College.

The conference was aided by an advisory panel of distinguished educational leaders representing 14 universities and colleges, the National Science Foundation and the American Ceramic Society.

Many engineering educators have stated in recent years that undergraduate engineering students need a fuller and deeper understanding of the structure and behavior of solids, particularly crystalline substances. Dealing constantly with solids, the practicing engineer finds that much of his knowledge is too empirical to be of the greatest use in modern applications, and that he needs to know more concerning the contributions made by electronic and atomic research to our knowledge of the solid state. Graduate students of engineering in most educational institutions receive this information, but the undergraduate course of studies has not included it in any systematic way.

A Common Board Judges Electronics

A common pine board verifies the accuracy of an ingenious electronic width gauge at U. S. Steel's Gary Sheet and Tin Mill, Gary, Ind.

The simple measuring device is nothing more than a 4-inch wide, 8-foot long pine board that provides the only accurate check of the new width gauge installed on their mill.

The gauge, the mill's latest innovation, scientifically measures and records the width of the racing, fiery-red steel strip by means of infrared rays, an intricate arrangement of prisms, rotating mirrors, and related electronic equipment.

But, just to check this electronic device a crew member places the pine board under the hot ribbon of steel. The hot steel, operating at speeds in excess of 1,500 feet per minute, burns its exact width into the board. The burn marks are then measured and checked against the electronic instrument located on the finisher's pulpit.

The gauge and pine board enable the mill to produce and control the width of coiled steel products more accurately.

Engineering Societies Personnel Service, Inc.

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These items are from information furnished by the Engineering Societies Personnel Service, Inc., Chicago. This SERVICE, operated on a co-operative, non-profit basis, is sponsored by the Western Society of Engineers and the national societies of Civil, Electrical, Mechanical and Mining and Metallurgical Engineers. Apply to ESPS, Chicago and the key number indicated. Prepared ENGINEERS AVAILABLE advertisements limited to 40 words, with typed resume attached may be submitted to ESPS Chicago by members of Western Society of Engineers at no charge.

SPECIAL NOTICE

FOR YOUR CONVENIENCE THE CHICAGO OFFICE WILL BE OPEN WEDNESDAY EVENINGS UNTIL 7:15. THIS SCHEDULE WILL CONTINUE THROUGH FEBRUARY AND MARCH ON A TRIAL BASIS. WE WILL BE HERE TO HELP YOU. COME IN AND SEE US.

RECEPTIONIST'S CORNER

March is the time of year when the winds really howl. The cold winter is almost over and everyone is thinking of spring. Now is the time to look for the new position you have been dreaming about. Let us help you find what you are looking for. Employers, if you're looking for an engineer, we would be glad to have you call or drop in and list your specifications with us.

POSITIONS AVAILABLE

C-1593 CONSULTING ENGR. Well versed in refining operations of bismuth and able to redesign or improve equipment or processes as needed. Duties: increase bismuth to highest purity obtainable in plant now in operation but far from modern. Sal: $1,000 mo. plus allowances. Location: Korea.

C-1954 ENGINEERING RECRUITMENT OFFICER Engrg. Deg. 3 plus yrs. exp. in personnel, recruiting, or similar activities. Knowledge of engineering positions. Duties: travel Midwest recruiting engineering personnel for large aircraft manufacturer. Salary $7,500-$9,000. Travel: great deal. Location: Chicago.

C-1595 (c) MAINTENANCE ENGINEER Engr. Deg. Age: Up to 45. 3 plus yrs. exp. in maintenance and repair of heavy equipment. Knowl: chemical or mining operations. Duties: maintenance and repair of heavy equipment for a chemical and mining company. For a manufacturer of minerals. Sal: $6,000-$8,000. Location: Florida.

C-1600 CHIEF ELECTRONIC ENG. EE Preferred. Exp. in electronics using audiometers, transistors, or audio equip. and desirable in hearing aids. Know: circuitry. Duties: heading up electronic section on research & development of hearing aids. Sal: $8-12,000. Loc: Chgo. Employer will negotiate fee.

C-1605 SALES ENGINEERING TRAINEE—Engrg. Deg. Age: 25-29. Must have been an honor student and have definite sales aptitude. Knowledge of industrial machinery. Duties: sell complete lubricating program to industrials covering full line of petroleum products. Deal with top management for most part. With major oil company. Training position. Salary: $4-450 per month. Employer will negotiate fee. Location: Chicago.

C-1619 MAINTENANCE ENGINEER. Age: 40 or over. 5 plus yrs. exp. in maintenance of rubber or textile fabricating machinery. Duties: maintenance engineer on heavy plant equipment for a felt manufacturer. Salary: up to $9,000 per yr. Employer will pay fee. Location: Chgo.

C-1626 (a) METALLURGIST — Technical Division. 3 plus yrs. in foundry trouble shooting and preferably in magnesium or aluminum. Knowledge of magnesium and casting. Duties: foundry trouble shooting, customer complaints on technical questions, and supervision of routine testing laboratory. For a mfgr. of magnesium castings. Salary: $700 mo. up to $12,000 depending on background. Employer will pay fee. Location: Chgo.

C-1626 (b) METALLURGICAL PROJECT ENG. Met. or met. engr. 3 plus yrs. exp. in white metal foundry practices. Knowledge of magnesium processing helpful. Duties: project work on development research projects on magnesium. For a manufacturer of mag. castings. Salary $550-$650 per mo. Employer will pay fee. Location: Chicago.

C-1626 (c) SUPERVISING PROJECT ENGINEER ME 3 plus yrs. exp. in machine shop tooling and preferably in pumps and valves. Supervisory ability. Duties: organize, scheduling and direct all engineering work necessary for custom built pumps, valves and hydraulic equipment. For a manufacturer of pumps. Salary: $550 to $750. Employer will pay fee. Location: Chicago.

If placed in a position as a result of an Engineers Available or Position Available advertisement, applicants agree to pay the established placement fee. These rates are available on request and are sufficient to maintain an effective non-profit personnel service. A weekly bulletin of positions open is available to subscribers. Apply ESPS Chicago.

ENGINEERS AVAILABLE

810 MW RES. ENGR. 45 One yr. charge of production and entire plant making automotive products. Two & one half yrs. designed air conditioners and lighting equipment. Four yrs. elect. & mech. engr. improving methods and production of lighting equipment. $5,200 Chicago.

811 MW ENGINEER 27 Thirty yrs. Jr. Engr. working with and testing radar indicators, and radar test equipment $5,000 Chicago.

812 MW PLANT ENGR. ME 33 Four yrs. engineer performing tests on power equipment and writing reports. Three mos. assisting fitter in machine shop in disassembling machine parts and reassembling again. Midwest $5,700.

813 MW PLANT ENGINEER. ME 31 Three yrs. plant engr. supervising maintenance, plant layout, fixture design, purchasing. Three yrs. designing, layouts, checking supervising of detailing group. $6,000 Midwest.

814 MW PROJECT ENGR. ME 28 Four mos. drafting & design modification of existing equip. & new equip. Twenty-one mos. plant equipment investigation, spec. writing and inquiry writing. Three & one half yrs. customer representative on the inspection of all types of steel piping & plant equipment. $5700 U.S.

815 MW PRODUCT ENGR. ME 31 Seven mos. develop tools, dies, & processing for pipe & fittings. Thirteen mos. set up tooling & processing of waveguides and other electronic equipment. Four mos. develop equip. such as weightmaking machines. $6,500 Midwest.

816 MW CHEM. ENGR. BS Chem. Eng. MS-Ind. Engr. 49 Twenty-eight yrs. doing development, sales, financial, patents, cost analysis & controls, job evaluation, special management assignments. $15,000 Midwest.

817 MW Ind. Mgmt. Engr. Ind. Engr. 27 Thirty mos. supervise time study & payroll men, wage incentive plan, did labor estimating, made up & controlled process sheets. Four mos. Time studies on screw machine products. $5,700 Chgo.

Cleveland to Have Engineering Center

Exemplifying the growth and importance of engineering in the industrial northeastern Ohio area, a $1,378,000 building and development program for the construction of a new downtown Engineering Center has been announced by the Cleveland Engineering Society.

Plans for the project, which will be completed as the Society prepares for its 75th anniversary, have been outlined at a number of special meetings for the membership and the area's industrial leaders.

To be known as the Cleveland Engineering Center, the two-story structure will be of contemporary design and will provide facilities aimed at making it the focal point of all engineering activities in northeastern Ohio.

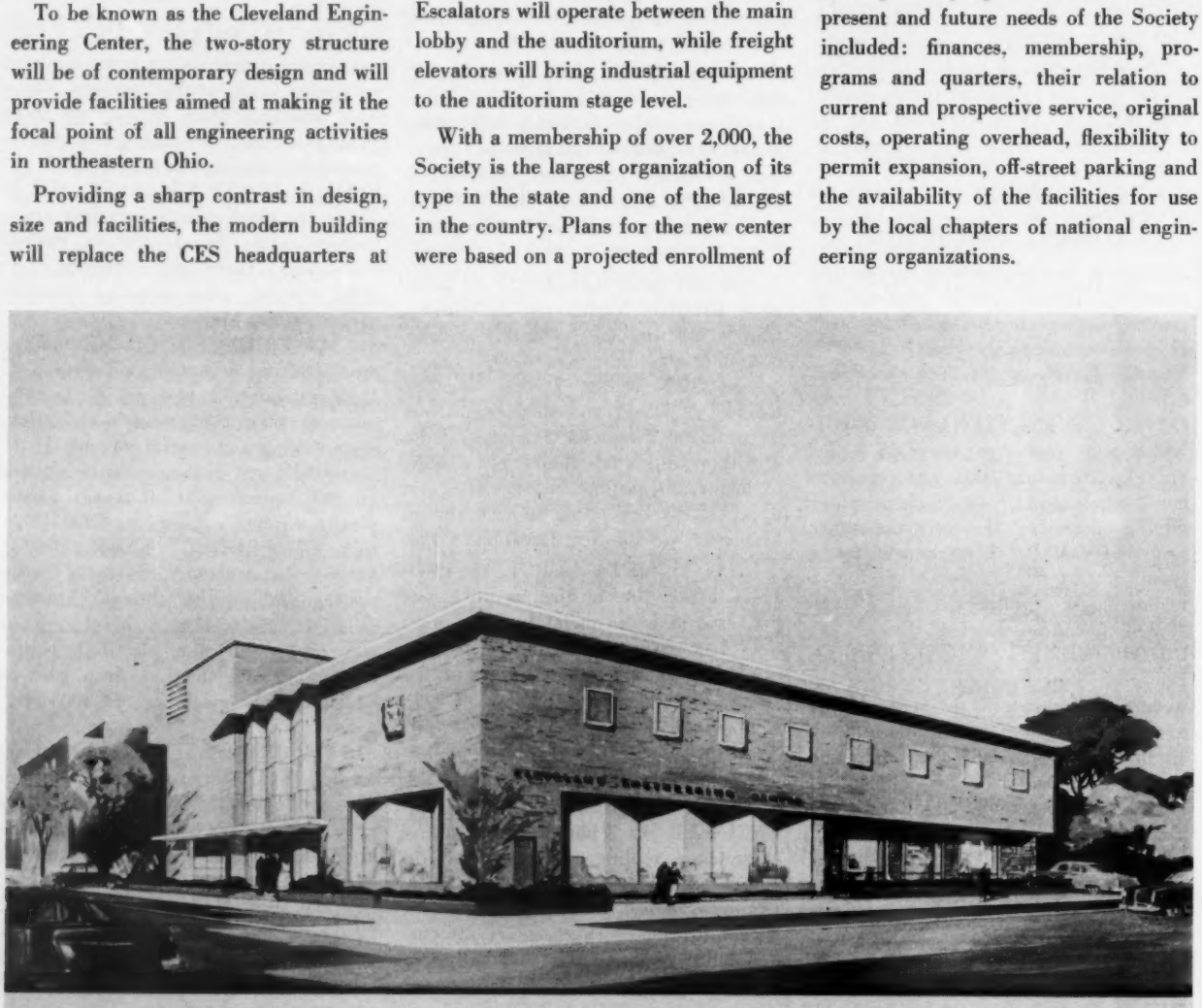
Providing a sharp contrast in design, size and facilities, the modern building will replace the CES headquarters at 2136 East 19th St. The Drake Hotel, presently occupying the site of the proposed center, is to be torn down.

Some 36,000 square feet of space will be provided in the new center. It will have an auditorium seating 950 people and dining rooms equipped to serve 400 people. Preliminary architectural sketches prepared by Garfield, Harris, Robinson and Schafer, Cleveland architects, show unusual designs for meeting, conference and class rooms, administrative offices and industrial exhibit space. Escalators will operate between the main lobby and the auditorium, while freight elevators will bring industrial equipment to the auditorium stage level.

With a membership of over 2,000, the Society is the largest organization of its type in the state and one of the largest in the country. Plans for the new center were based on a projected enrollment of 4,000 members, as interest and growth continues, according to Society President Ralph R. West, president, West Steel Casting Co.

"Rather than being offered as a building to be," West said, "the center is projected as a 'factory-to-do'."

Announcement of the Building and Development Program was the culmination of months of exhaustive work by committees of the Cleveland Engineering Society. Considerations in arriving at a development program tailored to meet present and future needs of the Society included: finances, membership, programs and quarters, their relation to current and prospective service, original costs, operating overhead, flexibility to permit expansion, off-street parking and the availability of the facilities for use by the local chapters of national engineering organizations.



·PROPOSED·HEADQUARTERS ~ CLEVELAND·ENGINEERING·CENTER·

Reviews of Technical Books

Circuits

Direct-Current Circuits, by Earle M. Morecock, McGraw-Hill Book Company, Inc., New York, N. Y. Second Edition, 1953. 383 pages. Price $5.00.

This book was prepared as a text for the first course in electricity offered in technical institutes and junior colleges. Algebra is the only mathematics necessary for the study of this text.

The material included is a necessary prerequisite to the study of communications and power. A number of examples, followed by problems, are given throughout the text. In addition, other problems of a more difficult nature are included at the end of the chapters.

The first edition of this book was published in 1944. In this edition the introductory material has been rewritten and expanded to form a new chapter. The meter-kilogram-second system is now used throughout the text. Chapter three of the old text has been rearranged to form chapter four, measurement of potential and current, and chapter five, measurement of resistance. The chapter on networks has been expanded to include methods of solving network problems generally used in communications. Circuit drawings have been altered in order that the symbols used agree with the latest standards of the A.I.E.E.

In addition to being a text for technical institute and junior college students, this book could be used for industrial and extension courses.

R.G.O., W.S.E.

Electronic Motion

Fundamentals of Electronic Motion, by Willis W. Harman, McGraw-Hill Book Company, Inc., New York, N. Y., First Edition, 1953. 319 pages. $6.50.

This is a book on analysis with concentration on general philosophies, understandings, and attitudes in contrast to emphasis on current engineering practice and specific design techniques.

The book was written as a text for advanced undergraduate and first year graduate students. Ordinary and practical differential equations are used in the presentation of the material and are necessary for the solution of many problems included.

Chapter one on fields and electrons contains information necessary for the understanding of the analysis in the remainder of the book. This chapter contains a discussion of basic laws, basic field relations, solutions of Laplace's and Poisson's equations, and approximate methods of field determination.

The material throughout is presented with the emphasis on analysis. The many problems included increase the book's usefulness to the student who is striving for a thorough knowledge of the methods presented.

In addition to using this book as a text, the engineer who may not have approached the subject from this standpoint during his years of formal education could profit by studying it now.

R.G.O., W.S.E.

Automatic Control

Automatic Control of Heating and Air Conditioning, by John E. Haines, McGraw-Hill Book Company, Inc., New York, N. Y., First Edition, 1953. 370 pages. Price $6.75.

This book was written as a text for beginning students interested in the automatic control of heating and air conditioning.

The fundamentals of control are discussed in the first chapter, followed by definitions of terms used in control in chapter two. A discussion of fundamentals of measurement is presented in chapter three.

The following chapters, four through seven, consider electric-control circuits and units and pneumatic-control circuits and units.

Chapters eight through fourteen, with the exception of chapter thirteen, discuss control of various heating and ventilating systems, commercial and domestic. Chapter thirteen is on the control of commercial refrigeration.

This book is not an installation or service manual. The basic problems of automatic control in the heating and air conditioning field and the principles applied in solving them are discussed. The book is recommended for the beginner in this field.

R.G.O., W.S.E.

Engines

Elements of Internal-Combustion Engines, by A. R. Rogowski, McGraw-Hill Book Company, Inc., New York, N. Y., First Edition, 1953. 234 pages. $5.50.

This book was written for the engineering student who, although not expecting to enter the engine field professionally, would appreciate the benefits derived from a study of the basic theory of the internal-combustion engine.

A number of examples are included which, in addition to the many problems at the conclusion of the chapters, illustrate basic principles in many fields of engineering. These include work in thermodynamics, fluid flow, lubrication, and vibration. Emphasis has been placed upon application of the principles of mathematics, chemistry and physics to the specific engineering problems involved.

The material is presented in a straight forward manner. A knowledge of elementary physics and chemistry, together with calculus and the first course in thermodynamics and mechanics, should suffice as pre-requisites for the understanding of the material presented.

The book is recommended for the function for which it was prepared as stated in the first paragraph of this review.

R.G.O., W.S.E.

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To All Corporate Members:

Proposed Amendment to the Constitution of the Western Society of Engineers

In accordance with Article XV, Section 2, of the Constitution of the Western Society of Engineers, the following notice is printed, and herewith mailed.

The proposed Amendment to the Constitution of the Western Society of Engineers, as set forth below, has been submitted by 25 Corporate Members, in accordance with Article XV, Section 1.

Subsequently, the proposed Amendment was submitted to the Board of Direction and referred to the Amendments Committee, which latter body reported to the Board of Direction at its regular March meeting. The proposed Amendment was approved by the Board of Direction of the Western Society of Engineers, upon recommendation of the Amendments Committee.

Proposed Amendment

Article V— Membership

Section 6—Strike out the last paragraph reading "He shall transfer to Member grade not later than his 35th birthday."

Section 8—Revise this section, by adding the words italicized, to read:

"An affiliate Member shall be a person not qualified for Member or Associate Member grades, but who is interested in the advancement of engineering, as may be evidenced by an employment which has involved dealing or associating with engineers, *relative to technical matters*, for a period of at least two years."

Add new Section 9—

"A non-graduate of an engineering curriculum approved by the Board of Direction may be given credit toward the required experience specified in Sections 5 and 6 at the rate of 1⅓ years for each full year of such curriculum satisfactorily completed but not to exceed a total of four years.

"An applicant who has attended a non-accredited engineering curriculum may be given credit for work satisfactorily completed in said curriculum at a rate not to exceed 1 year for each full year completed but not to exceed a total of three years."

Section 9—Re-number this section to Section 10. No change proposed to the text of the section.

Article VII—Fees and Dues

Section 1—The proposed change of annual dues for Associate Member grade to be as follows:

		Annual Dues	
	Entrance Fee	*Resident*	*Non-Resident*
Assoc. Member (First 7 years in grade)	$10.00	$10.00	$ 6.50
Assoc. Member (After 7 years in grade)		20.00	13.50

Meeting Call

This is to notify all Corporate Members that at the April 26, 1954 meeting of the Western Society of Engineers, at its headquarters, the above Amendment shall be the order of business for discussion in accordance with Article XV, Section 2, of the Constitution of the Western Society of Engineers.

Industry Looks for Better Ways to Work

Industry's continuing search for better ways to do work was the topic of a conference which was held on March 4 and 5, at Illinois Institute of Technology, Chicago.

Approximately 250 industrial engineers and factory management people were on hand to attend the Work Study conference being sponsored by the Illinois Tech department of industrial engineering.

Cooperating in sponsoring the conference were the Chicago Association of Commerce and Industry, American Society of Tool Engineers, and the Chicago chapters of American Institute of Engineers, Industrial Management Society, National Association of Suggestion Systems, and Society for the Advancement of Management.

One of the highlights of the conference was a speech by Ewan Clague, commissioner, Bureau of Labor Statistics, U. S. Department of Labor, Washington, D. C., at the March 4 luncheon.

Dr. John T. Rettaliata, MWSE, president of Illinois Tech, introduced Clague, whose topic was given as "An Appraisal of American Productivity."

Alderman Robert E. Merriam of Chicago's fifth ward spoke at the March 5 luncheon on "Making City Government Effective." He was introduced by Clarence E. Deakins, dean of students at IIT.

Dr. Marvin E. Mundel, associate director, management center, Marquette university, discussed "Work Study — Key to Productivity" at the session.

The workshop technique was used to help participants solve their productivity problems. Specialists from education, government, and industry served as chairmen of the various sessions, while other specialists from business, industry and education were panelists. The panels discussed and offered solutions to problems presented by participants.

Several other IIT men participated in the conference. Dr. Maurice D. Kilbridge,, who heads the department of industrial engineering, was chairman of the general session on March 4. Dr. Ralph G. Owens, MWSE, dean of engineering, spoke briefly.

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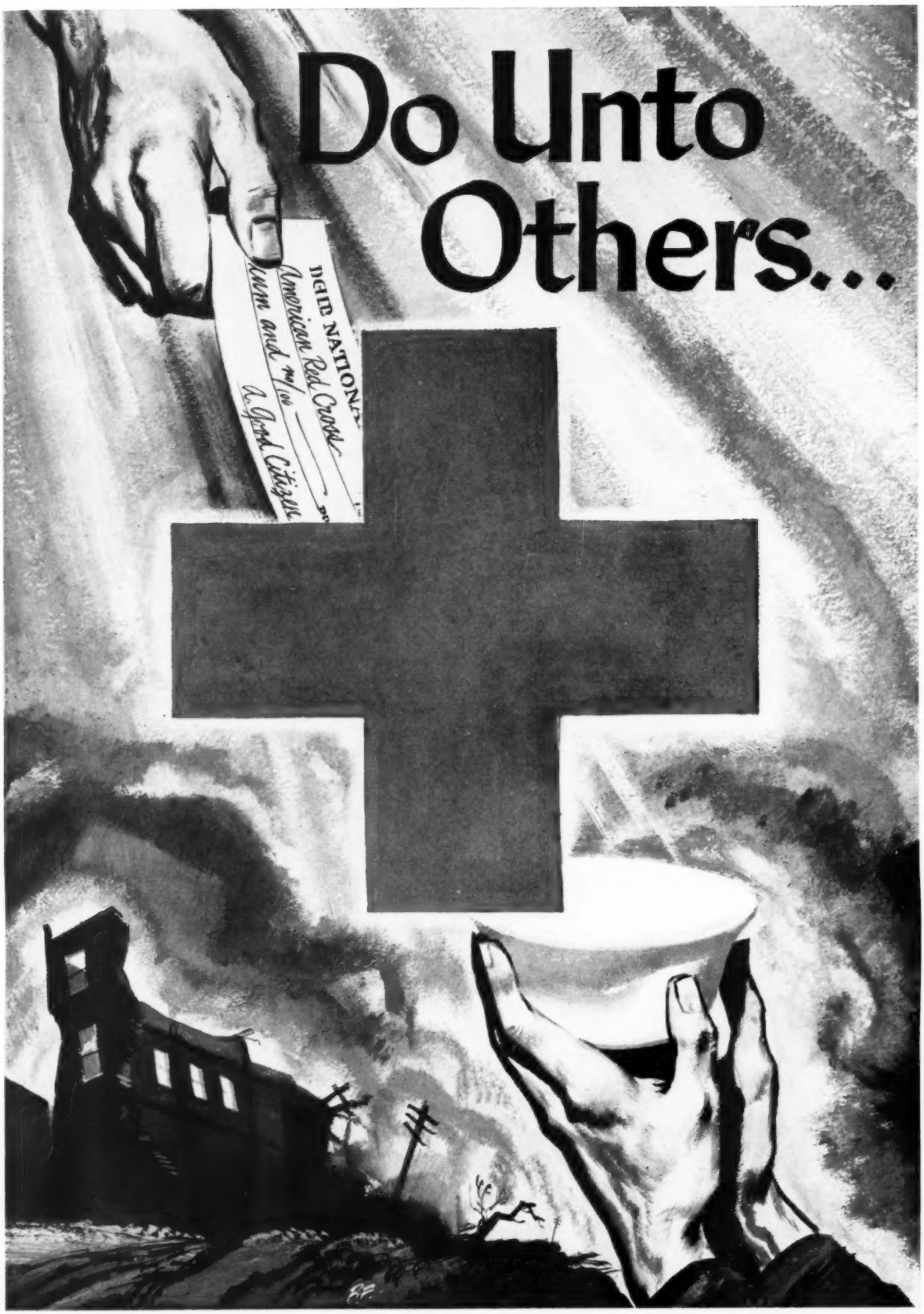
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